

Amendment and Response Under 37 C.F.R. 1.116

Applicant: Gerold Gruendler et al.

Serial No.: 10/598,285

Filed: June 21, 2007

Docket No.: I431.174.101/FIN565PCT/US

Title: COOLING SYSTEM FOR DEVICES HAVING POWER SEMICONDUCTORS AND METHOD FOR COOLING THE DEVICE

REMARKS

The following remarks are made in response to the Final Office Action mailed January 21, 2009. Claims 1-9, 12, 13, 20, 21, and 29 have been previously cancelled without prejudice. Claims 10, 11, 14-19, 22-28 and 30-33 were rejected. Claims 10, 26 and 27 were objected to. With this Response, claims 10, 18, 26, and 27 have been amended, and claims 34-39 have been added. Claims 10, 11, 14-19, 22-28 and 30-39 remain pending in the application and are presented for reconsideration and allowance.

Claim Objections

Claims 10, 26, and 27 were objected to for minor informalities.

With this Response, claims 10, 26, and 27 have each been amended to correct the informalities identified by the Office Action. As such, Applicants respectfully request that the objections to claims 10, 26, and 27 be withdrawn.

Claim Rejections under 35 U.S.C. § 102

Claims 27-28 and 33 were rejected under 35 U.S.C. 102(e) as being anticipated by US Patent Pub. No. 2005/0201063 to Lee et al. ("Lee").

Applicants respectfully submit that Lee fails to anticipate the cooling system as defined by amended independent claim 27. Lee describes a semiconductor module 50 including heat sinks 53 positioned in contact with semiconductor devices 32 mounted on printed circuit boards (PCBs) 31 which are plugged into sockets 2 on a mother board 1 (Figure 6). Lee focuses on shapes of heat sinks 53 which improve heat transfer from PCBs 31, such as heat sinks 53 having a flat portion 53a in contact with semiconductor devices 32 and a corrugated portion 53b above semiconductor devices 32 (Figure 6), and as having a trapezoidal shape with a greater height in a direction of an air flow across module 50 (Figures 4 and 5). Other than describing heat sinks 53 as being in contact with semiconductor devices 32, Lee provides no description whatsoever as to how heat sinks 53 are mounted on semiconductor module 50, and certainly makes no teaching or suggestion that heat sinks 53 are **mounted in a pivotable manner, via a tilting mechanism**

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extending from an edge of the cooling plate, about a tilting axis extending along a plug-in contact strip so as to be pivotable between a maintenance position and an operating position, as defined by amended independent claim 27.

In view of the above, Applicants respectfully submit that Lee fails to teach or suggest the cooling system as defined by amended independent claim 27. As such, Applicants respectfully request that the rejection of independent claim 27 under 35 U.S.C. 102 over Lee be withdrawn and that independent claim 27 be allowed.

Since claims 28 and 33 depend from and further define patentably distinct independent claim 27, Applicants respectfully request that the rejections of dependent claims 27 and 33 under 35 U.S.C. 102 over Lee also be withdrawn and that dependent claims 28 and 33 be allowed as well.

Claim Rejections under 35 U.S.C. § 103

Claims 10-11, 14-17 and 30 were rejected under 35 U.S. C. 103(a) as being unpatentable over Lee in view of US Patent Pub. No. 2006/0139891 to Gauche et al. (“Gauche”).

Claims 18-19, 22-26 and 31-32 were rejected under 36 U.S. C. 103(a) as being unpatentable over Lee .

Applicants respectfully submit that neither Lee nor Gauche, either alone or in combination, teach or suggest the cooling system defined by amended independent claim 10. As described above with respect to independent claim 27, Lee focuses on shapes of heat sinks 53 which improve heat transfer from PCBs 31 and, other than describing heat sinks 53 as being in contact with semiconductor devices 32, Lee provides no description whatsoever as to how heat sinks 53 are mounted on semiconductor module 50. Gauche describes a heat spreader 200 which is mounted in a fixed position on a mother board 210 (Figure 2A). As such, neither Lee nor Gauche, either alone or in combination, teach or suggest **a cooling plate mounted in a pivotable manner, via a tilting mechanism extending from an edge of the cooling plate, about a tilting axis on a plug-in contact strip, and having an operating position wherein the cooling plate is pressed onto a power semiconductor component a maintenance position**

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wherein the cooling plate is pivoted away from the power semiconductor component, as defined by independent claim 10. Accordingly, Applicants respectfully request that the rejection of independent claim 10 under 35 U.S. C. 103 over Lee in view of Gauche be withdrawn and that independent claim 10 be allowed.

Applicants further submit that the power semiconductor device as defined by amended independent claim 18 is non-obvious over Lee. Again, as remarked above with respect to independent claim 27, other than describing heat sinks 53 as being in contact with semiconductor devices 32 on PCBs 31, Lee provides no description whatsoever as to how heat sinks 53 are mounted on semiconductor module 50, and certainly makes no teaching or suggestion that heat sinks 53 are mounted in a pivotable manner, via a tilting mechanism extending from an edge of the cooling plate, about a tilting axis on the plug-in contact strip in a region of the at least one of power semiconductor component and configured to be pivoted about the tilting axis via the tilting mechanism, which extends parallel to the plug-in contact strip, as defined by amended independent claim 18.

In view of the above, Applicants submit that Lee fails to teach or suggest the power semiconductor device as defined by independent claim 18, and respectfully request that the rejection of independent claim 18 under 35 U.S. C. 103 over Lee be withdrawn and that independent claim 18 be allowed.

Amended independent claim 26 defines a method of cooling a device and includes limitations similar to those described above with respect to independent claim 18. As such, for at least the reasons remarked upon with respect to independent claim 18, Applicants respectfully request that the rejection of independent claim 26 under 35 U.S. C. 103 over Lee also be withdrawn and that independent claim 26 be allowed as well.

Since claims 11, 14-17, and 30 further define patentably distinct independent claim 10, and claims 19, 22-25, 31, and 32 further define patentably distinct independent claim 18, Applicants respectfully request that the rejections of dependent claims 11, 14-17, 19, 22-25, and 30-32 under 35 U.S. C. 103 also be withdrawn and that dependent claims 11, 14-17, 19, 22-25, and 30-32 be allowed as well.

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Added Claims

With this Response, claims 34-39 have been added. Claims 34-37 depend from patentably distinct claim 10, and claims 38-39 depend from patentably distinct independent claim 27, and further define the tilting mechanism. In addition to being allowable for further defining patentably distinct independent claims 10 and 27, Applicants submit that claims 34-39 are allowable over the cited references since none teach or suggest a tilting mechanism extending from an edge of the cooling plate and at an angle to a surface of the cooling plate which is pressed onto the power semiconductor component, a snap-action closure, or a snap-action hook, as defined further defined by dependent claims 34-39.

As such, allowance of added claims 34-39 is respectfully requested.

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CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 10, 11, 14-19, 22-28 and 30-39 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 10, 11, 14-19, 22-28 and 30-39 are respectfully requested.

Applicant hereby authorizes the Commissioner for Patents to charge Deposit Account No. 50-0471 in the amount of \$260.00 to cover the fees as set forth under 37 C.F.R. 1.16(h)(i).

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Steven E. Dicke at Telephone No. (612) 573-2002, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

Dicke, Billig & Czaja
Fifth Street Towers, Suite 2250
100 South Fifth Street
Minneapolis, MN 55402

Respectfully submitted,

Gerold Gruendler et al.,

By their attorneys,

DICKE, BILLIG & CZAJA, PLLC
Fifth Street Towers, Suite 2250
100 South Fifth Street
Minneapolis, MN 55402
Telephone: (612) 573-2000
Facsimile: (612) 573-2005

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SED/GAK:cjs

/Steven E. Dicke/
Steven E. Dicke
Reg. No. 38,431